

The first nine chapters deal with machines and such details connected with them as frictional losses, energy of moving masses, relative velocities and accelerations, and output of work. There is an excellent chapter on simple harmonic motion, in which many of the difficulties are smoothed away which generally worry the young student entering for the first time on the study of this branch of the subject. The latter half of the book is devoted to stress and strain, bending moments, shearing forces, and stresses in beams, the stresses and amount of twist in shafts when transmitting power, and the stresses in simple loaded frameworks; it is rather strange that the authors have entirely omitted to deal with the deflection of beams. The last chapter is devoted to a simple treatment of the problem of the flight of projectiles.

The two authors have succeeded in writing on a well-worn subject a text-book which will be welcomed by many young engineering students because of the clear and lucid way in which fundamental principles are explained and enforced.

(2) This book is based upon the lectures delivered by the author to the students at the Technical College, Finsbury, London, and it covers more ground than is usual in the case of the more advanced text-books on this subject.

The first thirteen chapters are devoted to a consideration of the laws of motion, work, and energy; friction; the energy of rotating masses; centres of gravity, &c. There is nothing novel in the treatment of the subject, but fundamental principles are clearly enunciated and explained, and fully worked out examples are freely used in order to illustrate the application of these principles to the many practical problems which the engineer is called upon to solve.

The next eight chapters deal with the branch of the subject usually termed "Strength of Materials." Two excellent chapters on simple harmonic motion, and the balancing of rotating masses, are included in these eight chapters; in any future edition it would be an advantage to print these chapters immediately after chapter x. of the present edition, as this is the correct sequence for them.

The remainder of the book is devoted to elementary hydraulics and to the elements of the theory of the steam engine, including in the latter case such problems as the effects produced by the inertia of the reciprocating masses, the dynamics of steam engine governors, valve gears, and their effect upon the steam distribution. A four-figure table of logarithms is printed as an appendix, and will prove useful to students who are working through the problems given at the end of the book. The book will probably prove useful to junior students in technical colleges.

OUR BOOK SHELF.

The Microscopical Examination of Food and Drugs.
By Prof. H. G. Greenish. Second edition. Pp. xx+386. (London: J. and A. Churchill, 1910.) Price 12s. 6d. net.

The general excellence of this standard work, which first appeared in 1903, is maintained throughout the second edition, and its usefulness is increased by the addition of a valuable section on adulterants and an-

other on the practical examination of unknown powders. Other new subjects which have been introduced include notes on saffron and gentian, liquorice and calumba roots, and a description of a method of preparing fibres for cutting transverse sections. Otherwise no change has been made in the method of treating the subject-matter; and, indeed, none was necessary.

The first section deals with the various starches, complete instructions being given as to how to mount specimens for microscopic examination; the author describes the shape and appearance of the starch and explains how the grains can be sketched to their correct relative size. In subsequent chapters hairs and textile fibres, spores and glands, roots, woods, stems, leaves, flowers, barks, seeds, fruits, rhizomes, and roots are dealt with in an equally complete manner, and care has been taken to select types which will best illustrate the methods of examination described. With regard to foods, the book is essentially a treatise on practical methods rather than a complete guide to their examination.

In a future edition the inclusion of more foods would make the book of still greater use to analysts, but those at present included are well and adequately dealt with. In the very useful section on adulterants, oil cake might also have been treated from the point of view of the adulteration of oil cake itself; and, in passing, it may be noted, as a very minor point, that in giving the sources of oil cake, the author omits to mention cotton seed. The original illustrations are carefully drawn as to detail, and the drawings selected from other authorities are well chosen. The book will continue to be of great value to students and analytical chemists, as well as to those pharmacists who pursue their calling in its higher branches.

Child Problems. By Dr. G. B. Mangold. Pp. xv+381. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1910.) Price 5s. net.

In this volume the author deals principally with facts and figures obtained from American sources, but the problems are similar to those which were brought into prominence in England in 1904, when evidence was given before the Interdepartmental Committee on the causes of physical deterioration. Prevention is better than cure, and the hope for the future must always be with the younger generation. In some respects America is ahead of England. The deplorable waste of child-life owing to preventible causes is recognised as a national concern, and in many of the States there is a more or less efficient supervision and regulation of the milk supply. Separate courts for children have been established for some years in several of the States, and the whole attitude of society towards the youthful delinquent appears to offer more chance of reforming him than does the English system. In other respects possibly America might learn from England, e.g. in regard to factory legislation.

Social problems appear under somewhat different aspects in different countries, but all civilised communities are beginning to realise that national efficiency depends on prevention of the causes which lead to physical deterioration, and a study of the social problems connected with childhood has world-wide application.

"The child is father to the man": the physical, moral, and intellectual welfare of the race depend on the inheritance, training and education of the children. Child problems are the gravest of our time and the present volume should prove helpful to all who are anxious to further reform. The subject matter is dealt with under five heads: infant mortality, educa-

tional reform, child labour, the delinquent child, the neglected child. The author insists on the importance of securing the cooperation of women, but he omits to point out that until they possess the power and status of citizenship their power of helping will be crippled. The volume can be warmly recommended as a wise and human study of immensely difficult and important questions. Its value is enhanced by a full biography and an index. The type is clear and the printing good.

Der Begriff des Instinktes einst und jetzt. Eine Studie über die Geschichte und die Grundlagen der Tierpsychologie. By Prof. Heinrich Ernst Ziegler. Second revised and enlarged edition. Pp. vi+112+2 plates. (Jena: Gustav Fischer, 1910.) Price 3 marks.

This is a revised and enlarged edition of a luminous essay which Prof. Ziegler contributed to the Weismann Festschrift in 1904. It deserves to be widely known as a terse and interesting introduction to comparative psychology. The treatment is in the main historical, and the author makes a point of showing how the conception of instinct has mirrored the progress of science.

From the views of the Greek philosophers, the Church, and the old Vitalists, the author passes to Darwin and the Lamarckians, and thence to modern comparative psychology, as represented by workers like Lloyd Morgan, Groos, and Zur Strassen. Ziegler himself, following Weismann, interprets instincts as the outcome of the selection of germinal variations; they are now part of the inheritance and are objectively represented by pre-established nerve-paths. In his discussion he insists upon keeping to an objective consideration, for it is impossible to discover how far the lower animals are conscious.

In contrast to instinctive behaviour, we may speak of intelligent behaviour when it is worked out by the individual's experiments, when it requires to be learnt, when it is individually adjusted to particular circumstances. But when we reflect how little we know, for instance, in regard to the distribution of feelings of pleasure and pain among animals, we see the advisability of trying to define the grades of behaviour as objectively as possible. The author is, therefore, resolute in leaving consciousness and feeling and perception of purpose entirely out of account in his conception of instinct. At the close of the volume—which is all too short—there is an interesting appendix showing how the brains of workers, queens, and males among ants and bees differ from one another, as their instincts do.

Licht und Farbe. By Robert Geigel. (Pp. 199. (Leipzig: Philipp Reclam, junr., n.d.) Price 60 pfennig.

This little book belongs to a collection of volumes on "natural science" published in the series known as the "Universal Bibliothek," which is so familiar to students of German literature in this country, and which, in Germany, by providing, at the lowest possible cost, translations of the masterpieces of foreign literature, has helped to make the best books in many languages known to all classes of readers. The price of the usual small volume or "unit" of about a hundred pages is 20 pf. : a number of such units may make one book; thus the "Nibelungenlied" extends to four "units," and may be bought for about tenpence. Three units go to make the present volume, which is illustrated by seventy-five drawings in the text, and, in addition, four coloured plates—as well as a photograph of the author—all well printed.

The aim of this volume is to give a simple, popular account of the properties of light, and especially of

phenomena connected with variation in wave-lengths, or colour. From this point of view the ground covered is sufficiently extended: spectrum analysis, fluorescence, interference, polarisation, colour photography, meteorological optics, are all dealt with, in addition to the theory of instruments and photometry.

It would be idle to discuss such a book in any detail. In the nature of the case a work in German intended to give some popular account of elementary scientific ideas can have but little interest for English readers. Clerk Maxwell's "Matter and Motion" is a classic: this volume can pretend to no such distinction. We have not found it inspiring, and in lucidity it might be improved. There is a tendency to regard the general reader too much as a child, and in one instance at least the treatment is directly unscientific in giving as consequences of a law the facts which that law was invented to resume. On the whole, however, the book gives a tolerably readable elementary account of the branches of optics with which it is concerned, and no doubt will enable many a German to take an intelligent interest in matters in which he is not a specialist.

Catalogue of the Lepidoptera Phalaenae in the British Museum. Vol. x., Noctuidæ. (London: Printed by order of the Trustees, British Museum (Nat. Hist.). Price 20s.

THE tenth volume of this important work contains more pages than any which has yet been published, vol. vii., the largest of the preceding volumes, containing only 709 pages; and vol. ix. only 522, as against 829 pages in vol. x. The series of plates relating to vol. x. will include plates 148–173, and will be published early in 1911.

Vol. x. is devoted to the Erastrianæ, the thirteenth out of the fifteen subfamilies recognised by the author in the Noctuidæ, and contains descriptions of 1222 species (numbered from 4987 to 6197) belonging to 136 genera, a considerable number, both of genera and species, being described as new. There now remain only the subfamilies Hypeniniæ and Hyblæiniæ to complete the great group of Noctuidæ which, according to the provisional arrangement of families of Lepidoptera in the first volume of the present work, is only the fourth of fifty-two families, and is placed between the Agaristidæ and the Pterothysanidæ.

The Erastrianæ are moths of comparatively small size, and are very varied in their colour and markings, but the so-called "Noctud-pattern" is rarely present. "The subfamily is to a large extent confined to the tropical and warmer temperate regions, especially the more arid districts, and it has few species in the colder zones, and none in the Arctic and Alpine zones." A few species are British, but though some are abundant in special localities, they are not generally common.

The rapid progress which it has been found possible to make with so bulky and extensive a work is most remarkable, this being the second volume issued in 1910; and a volume appeared in each of the two preceding years.

Photography in Colours: A Text-book for Amateurs, with a Chapter on Kinematography in the Colours of Nature. By Dr. Geo. L. Johnson. Pp. viii+143. (London: Ward and Co., 1910.) Price 3s. 6d. net.

THE author has rewritten and enlarged the last section of his "Photographic Optics and Colour Photography," and in this volume issues it separately. Being "for amateurs," only those processes that are practically suitable for this class of workers are included, excepting the final chapter on kinematography. Indeed, the subject has been narrowed still further, for the only method treated of with any